System of Systems Engineering Implementation

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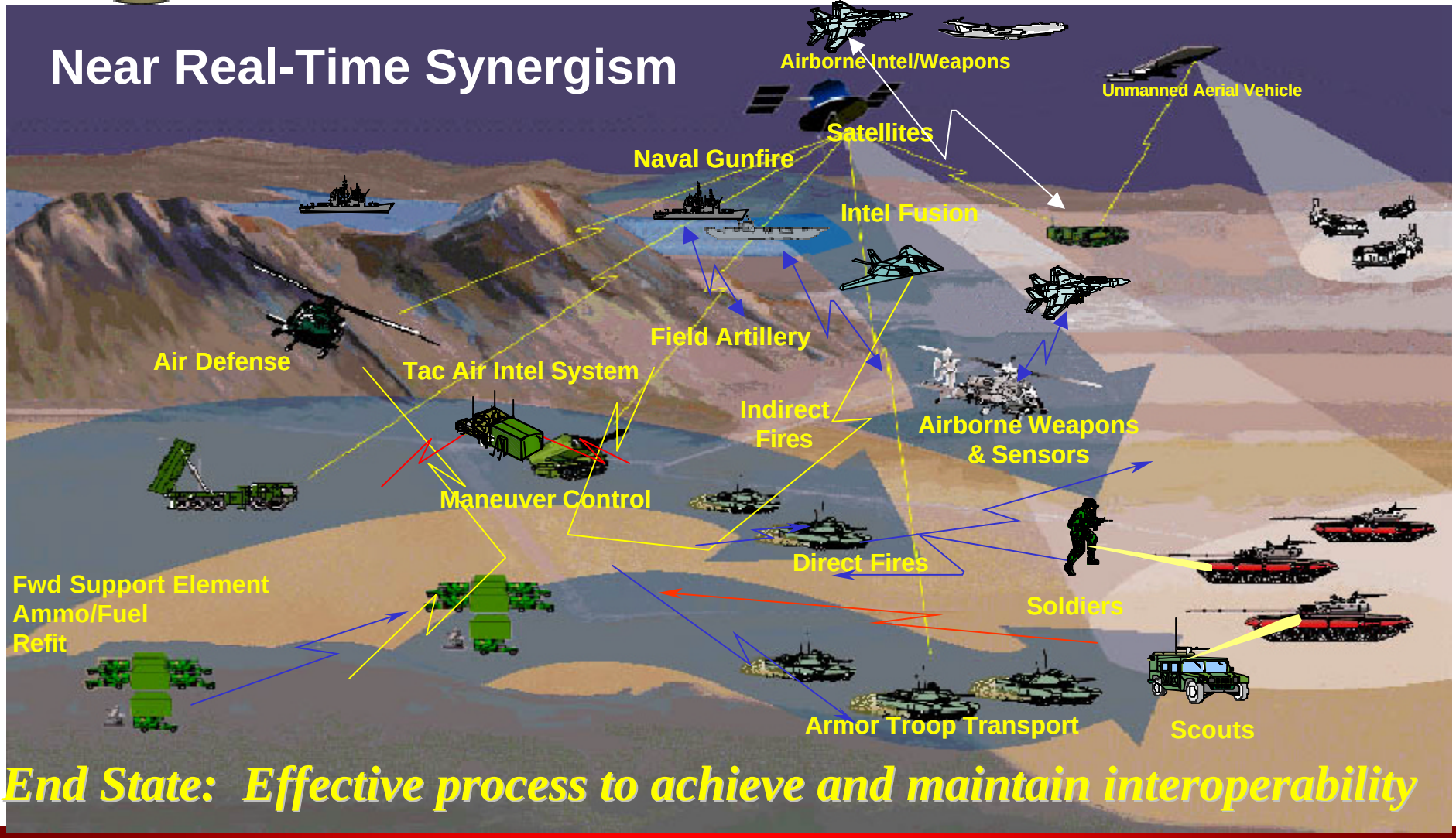
Purpose

Provide information on a new Army acquisition process for managing the engineering and development of a highly complex system of systems

The Goal: Total Systems Integration
(A Step Towards the Objective Force)



The Problem

Strategic Level

Requirements Development Integration Fielding

Operational Level

Lack of sustainable Integrated System of Systems Planning and Execution Mechanism

Instrumentation & Test Community

Tactical Level

Materiel Developer Community

Service Training and Doctrine Centers

Program management, Science and Technology Activities.

Currently:

- Requirements designed as system unique
- PMs/Developers execute independently
- Changes/Modifications are Platform/system centric
- Integration occurs at end of process with marginal Inter platform/system coordination
- Change is independent of schedule
- Funding based on stovepipes

Uncoordinated System Software Change

Hence:

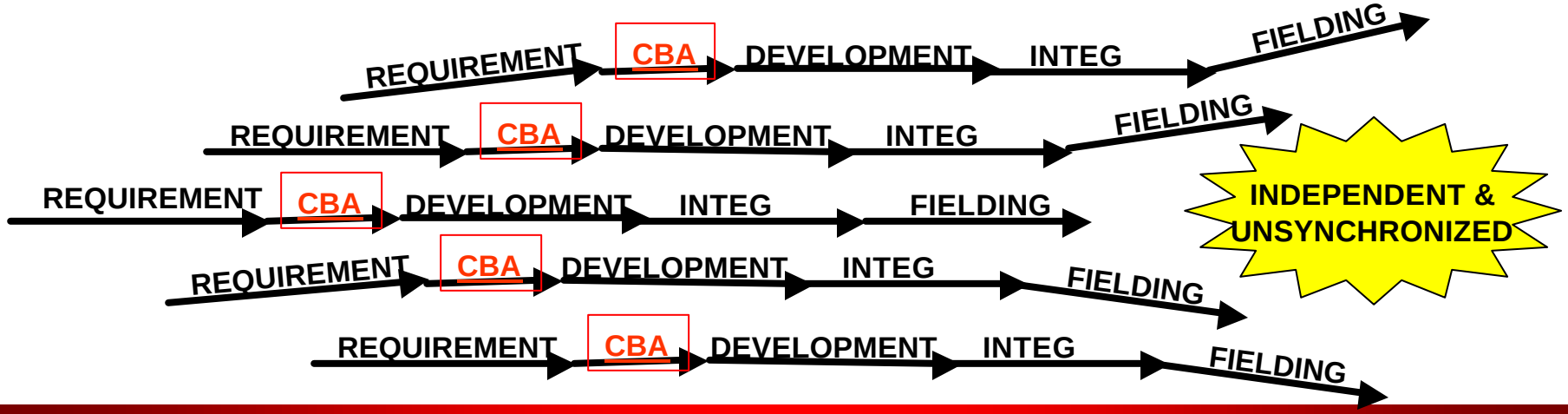
- No SoS integration
- No effective synchronization
- High cost and schedule
- Low return on investment

No Synergy

The Programmatic Problem

- **What is interoperable today may not be interoperable tomorrow**
- **Hundreds of Army, Other Service, Joint, and Coalition systems are being developed or changed on different timelines and for different reasons**
- **Programs are not harmonized from the perspective of the synergistic operational capability DELIVERED to the Warfighter**

CBA = Cost Benefit Analysis = Operational Effectiveness Increases



External Interoperability

FAAD C2 Interfaces
Avenger-Army-93
Linebacker-Army-93
LSDIS-Army-93
Patriot-Army-94
PLGR (GPS)-Army-93
Sentinel-Army-94
AWACS-joint (USAF)-93
Hawkeye-joint (USN)-93
JSN-joint-98
LLAPI/FAST-allied (FRG)-95

GCCS-A Interfaces
AIBS-Army-96
ALOG Processor-Army-96
AMSAA System-Army-96
APC System-Army-96
ARPERSCEN Sys-Army-96
CASCOM System-Army-96
COMPASS-Army-99
DAMO-ODR-Army-96
DAMO-SSW-Army-96
IOC System-Army-96
LOGSA Systems-Army-96
MMOF System-Army-96
MMT Processor-Army-96
RAPTOR-Army (NGB)-98
RCAS-Army-96
SAMAS (ISC-P)-Army-96
TORGNA Processor-Army-96
UNITREP System-Army-96
WARSIM 2000-Army-01
CTAPS-joint (USAF)-98
GCCS (TUCHA, etc.)-joint-96
GCCS/COP-joint-98
GCCS/GSORTS-joint-98
GCCS/JOPES-joint-98
ICIS-joint (DLA)-97
JTAV Processor-joint-98
JWARN-joint-01
MIDB Processor-joint-98
TBMCS-joint (USAF)-00

ISYSCON Interfaces
AKMS-Army-01
CSCE-Army-01+
ESOP-Army-01
NCS-E-Army-02
PLGR (GPS)-Army-01
EKMS-joint-01+

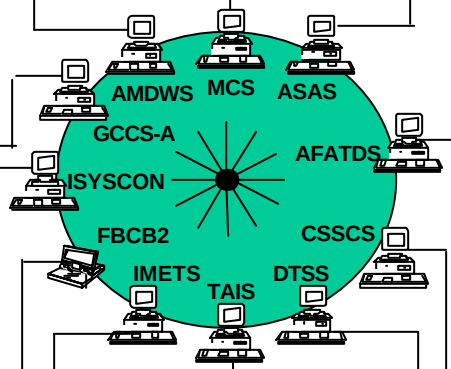
Example: TBMCS-joint-00
System
Interface Type
Army
Joint
Allied
US Agency
Implementation Year
(XX= TBD)

AMDWS Interfaces
CBS-Army-97
MEADS-Army-XX
Patriot-Army-99
THAAD-Army-XX
WARSIM 2000-Army-01
ADSI-joint-97
CTAPS-joint (USAF)-97
CTT-H/R-joint-98
JDP-joint-99
JTAGS-joint-98
JTT-joint-00
TBMCS-joint (USAF)-00
ACC-allied (NATO)-00+
CAOC-allied (NATO)-00+
GE MEADS-allied(FRG)-XX
GE Patriot-allied (FRG)-02
SAMOC-allied (FRG)-02
via ADSI, CTT or JTT
A2C2S-Army-03
Aegis-joint (USN)-XX
AWACS-joint (USAF)-99
CRC System-joint (USAF)-99
Hawkeye-joint (USN)-99
JLENS-joint-XX
TAOM/MCE-joint (MC/AF)-99
TIBS/TDDS-joint-98

FBCB2/EBC Interfaces
A2C2S-Army-03
BCIS-Army-XX
BFIST-Army-00
CCTT-Army-01
Comanche-Army-XX
Crusader-Army-05
FOS-Army-99
GCSS-A-Army-XX
Janus-Army-97
Kiowa Warrior-Army-97
Land Warrior-Army-XX
LFED-Army-99
Longbow Apache-Army-00
M1A2 SEP-Army-97
M2A3-Army-97
MFCS-Army-00
Paladin AFCS-Army-00
PLGR (GPS)-Army-97
SATIDS-Army-00
Wolverine-Army-00
JWARN-joint-01
USAF Systems-joint-XX

IMETS Interfaces
MMS-Army-00
TROJAN SPIRIT-Army-97
AFWA-joint (USAF)-98

MCS Interfaces
AMPS-Army-00
BPV-Army-XX
CBS-Army-97
MICAD-Army-97
NBCRS (Fox)-Army-XX
PLGR (GPS)-Army-97
WARSIM 2000-Army-01
CTAPS-joint (USAF)-97
Joint STARS CGS-joint-98
JWARN-joint-01
TBMCS-joint (USAF)-XX
TCO-joint (USMC)-XX
AUSTACCS-allied(Australia)-XX
DACCIS-allied (Denmark)-XX
E-IARRCIS-allied (UK)-99
HEROS-allied (Germany)-99
ISIS-allied (Holland)-XX
LFCS-allied (Canada)-XX
SIACCON-allied (Italy)-99
SICF-allied (France)-99
SIMACET-allied (Spain)-XX



TAIS (A2C2) Interfaces
A2C2S-Army-03
ADOCS-Army-00
AMPS-Army-00
AVTOC-Army-00
CBS-Army-00
Hunter UAV GSM-Army-00
Patriot-Army-00
PLGR (GPS)-Army-00
WARSIM 2000-Army-01
ADSI-joint-00
Aircraft (Military)-joint-00
ATC (Military)-joint-00
AWACS-joint (USAF)-00
CTAPS-joint (USAF)-00
Joint STARS CGS-joint-00
TBMCS-joint (USAF)-00
Aircraft (Civilian)-US-00
ATC (Civilian)-US-00
Radar (Civilian)-US-00

AFATDS Interfaces
ATHS-Army-96
BCS-Army-97
CBS-Army-97
Crusader-Army-05
DCT-Army-96
EFOGM-Army-XX
FDS-Army-96
FED-Army-96
Firefinder(Q-36)-Army-96
Firefinder(Q-36) V8-Army-99
Firefinder(Q-37)-Army-96
FIST DMD-Army-96
FIST DMD (Upgr.)-Army-99
IDM-Army-99
IFSAS-Army-99
LFED-Army-98
LTACFIRE-Army-97
MBC and IMBC-Army-97
MDS-Army-97
MFCS-Army-00
MLRS FCS-Army-97
MLRS (Imp) FCS-Army-00
MLRS FDS-Army-96
MMS-Army-99
Paladin AFCS-Army-00
PLGR (GPS)-Army-97
TUAV-Army-01
WARSIM 2000-Army-01
AFATDS-joint (USMC)-99
CTAPS-joint (USAF)-98
DCT-joint (USMC)-00
GCCS-M -joint (USN)-99
IFSAS-joint (USMC)-97
Joint STARS CGS-joint-00
JTT-joint-02
JWARN-joint-01
TBMCS-joint (USAF)-00
ADLER-allied (Germany)-02
ATLAS-allied (France)-02
BATES-allied (UK)-02
SIR [IT]-allied (Italy)-02

DTSS Interfaces
FAST-Army-XX
MITT-Army-XX
Joint STARS CGS-joint-XX
NIMA Libraries-joint (DoD)-00
[NIL, CIL, IPL]
TPC-joint (USMC)-01
DGSS-allied (Canada)-XX
TACISYS-allied (UK)-XX
TOPOSS-allied(Australia)-XX

ASAS Interfaces
ACS-Army-XX
Adv. QUICKFIX-Army-XX
AEPDS-Army-97
AMPS-Army-00
ARL-Army-XX
ATCAE-Army-97
CHATS-Army-XX
ETRAC-Army-97
ETRACKWOLF-Army-XX
GRCS-IPF-Army-97
Hunter UAV-Army-97
MIES-Army-97
Prophet-Army-XX
QUICKFIX II-Army-97
SSP-S-Army-97
TEAMMATE-Army-97
TES-Army-00
TRAILBLAZER-Army-97
TUAV-Army-01
WARSIM 2000-Army-01
CARS/TR1GS-joint (USAF)-97
CTT-joint-99
GCCS-M -joint (USN)-XX
IAS-joint (USMC)-XX
Joint STARS CGS-joint-97
JTT-joint-00
MIIDS/MIDB-joint (DIA)-97
NGIC System-joint (DoD)-XX
NPIC System-joint (NIMA)-XX
NSA System-joint (DoD)-97
TBMCS-joint (USAF)-00
TCAC-joint (USMC)-97
PASS-K-allied (Korea)-97

CSSCS Interfaces
CSSTSS-Army-97
DAMMS-R-Army-99
GCSS-A -Army-00
MC4-Army-XX
PLGR (GPS)-Army-97
SAAS-MOD-Army-99
SAMS-2-Army-97
SARSS-1-Army-97
SARSS-2AC-Army-98
SARSS-2AD-Army-98
SIDPERS-3-Army-99
SPBS-R-Army-97
TAMMIS-Army-99
TMIP-Army-XX
ULLS-S4-Army-98
WARSIM 2000-Army-01
GTN-joint-XX
MCSSCS-joint (USMC)-01
TC-AIMS II-joint-02
LOGLAGE-allied (FRG)-XX

Software Blocking

Definition and Scope

- **Definition**

  A balanced and disciplined policy/process for harmonizing requirements and development that leads to fielding and support of software intensive systems. It will ensure that they expedite the rapid delivery of innovative, integrated, and operationally suitable warfighter capability to the field.

•Will improve predictability
•Will program stability
•Will manage flexibility

- **Scope**

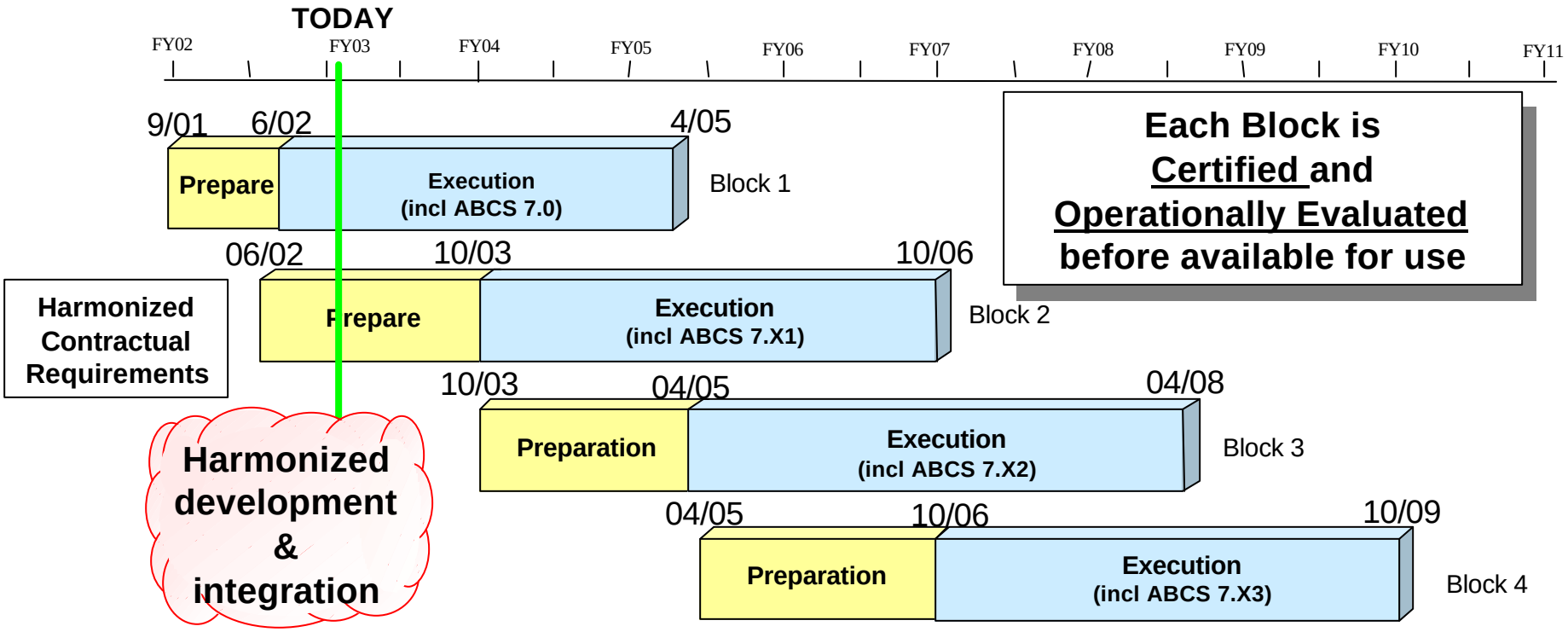
  With limited exception, the policy applies to all new and upgraded systems that exchange information. Business systems that do not exchange information directly with tactical C4ISR systems are excluded at this time.

Policy Signed by AAE and VCSA on 18 Sept 2001

SWB Activities
Multi-Block Execution

Transitioning away from a stovepipe acquisition process to one that is **SoS** focused AND includes Sim/Stim, Training, and Test systems.

Each Block Produces an Integrated Capability Package



BLOCK 1 System/Platform List

Core Systems (23)

ASAS Light/RWS
MCS(w/JWARN)
FOS(LFED/PFED/FSTU)
FBCB2
GCCS–A
M1A2SEP
M2A3 (IFV)/M3A3
AH-64D(IDM)
TAIS
TUAV
ISYSCON(TIMS)
C3 Driver
MFCS(XM95)
ECTA
IMETS
TOC Server
OH-58D(IDM)
AFATDS
Paladin
AMDPCS
FOX(MICAD)
DTSS
CSSCS

Enabling Systems (12)

ACUS Mod
BSN
EPLRS-RS/NCS/ENM
SINCGARS(ASIP/Airborne)
TOC Infrastructure
HF Gateway
VTT/PTT/MTT
TCIM
IDM
INC
MDL
A2C2S

Interfacing Systems (19)

AMPS(JMPS)
MLRS FDS
DBST
A3 BFIST
HIMARS
M270A1 (MLRS)
CTIA(DMPRC/FTI)
Land Warrior*
Patriot*
Stryker
CH-47F(IDM)
CCTT XXI
M270 (LRAV)
IFSAS
BCS
MMS
MTS
FF Q37
FF 36/EU

* System included for programmatic Integration purposes only; will not require certification

Core System: A system that provides the critical overall operational capability being incorporated in Block 1; will require certification and operational Evaluation participation.

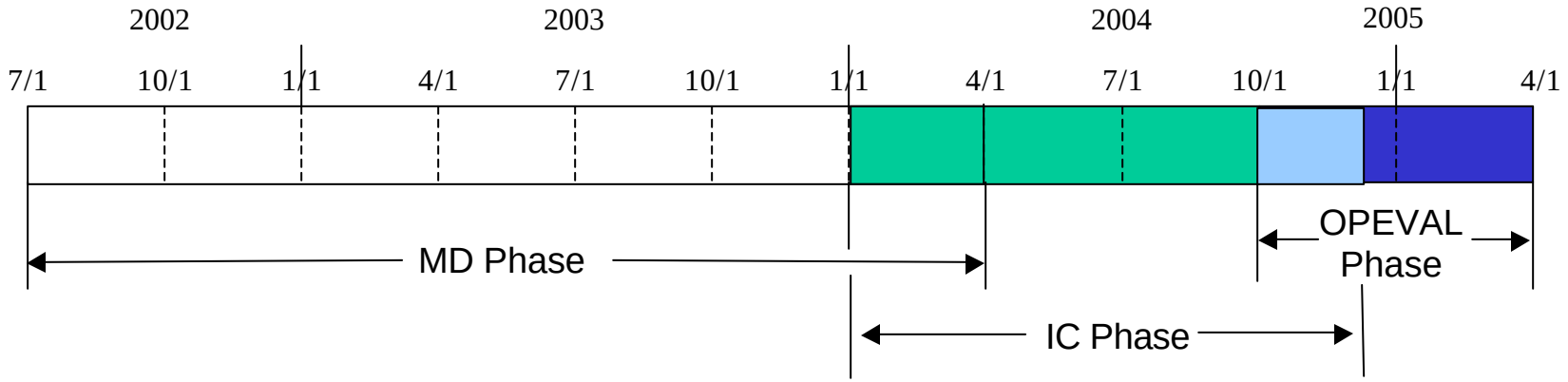
Enabler: A system that is key to supporting interoperability of core systems but may not require certification or operational evaluation. If a system requires certification it will be done as part of Software Blocking.

Interfacing System: A system that provides a significant capability and is required to undergo certification but not operational evaluation as a part of Block 1.

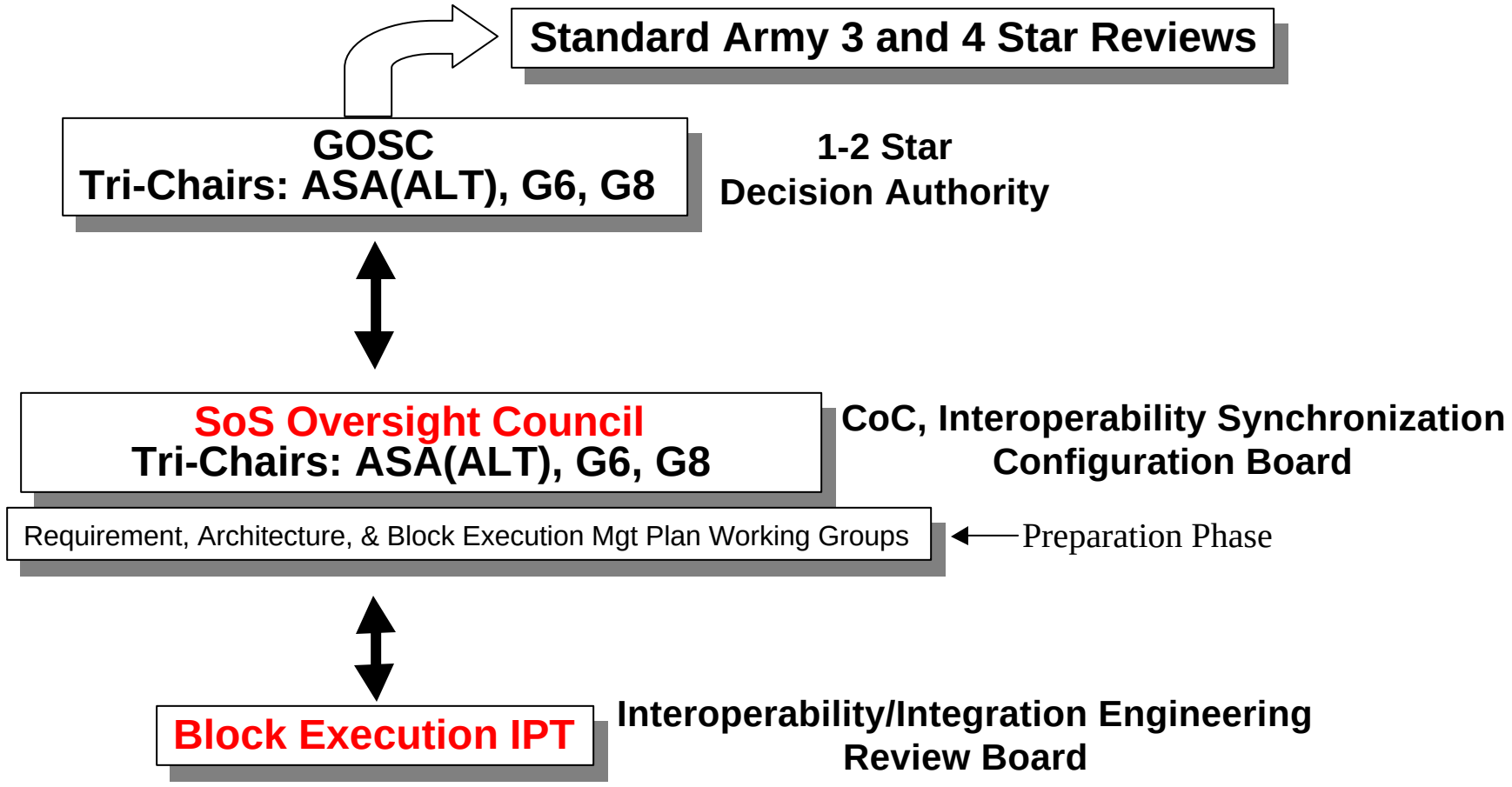
SoS Evaluation Concept

Three Phase Evaluation

- Material Development (MD) Phase lasting through 31 March 04
- Interoperability Certification (IC) Phase from 1 Jan 04 to 17 Dec 04
- Operational Evaluation (OPEVAL) Phase from 1 Oct 04 to 1 Apr 05



Management Structure



SWB Accomplishments Summary

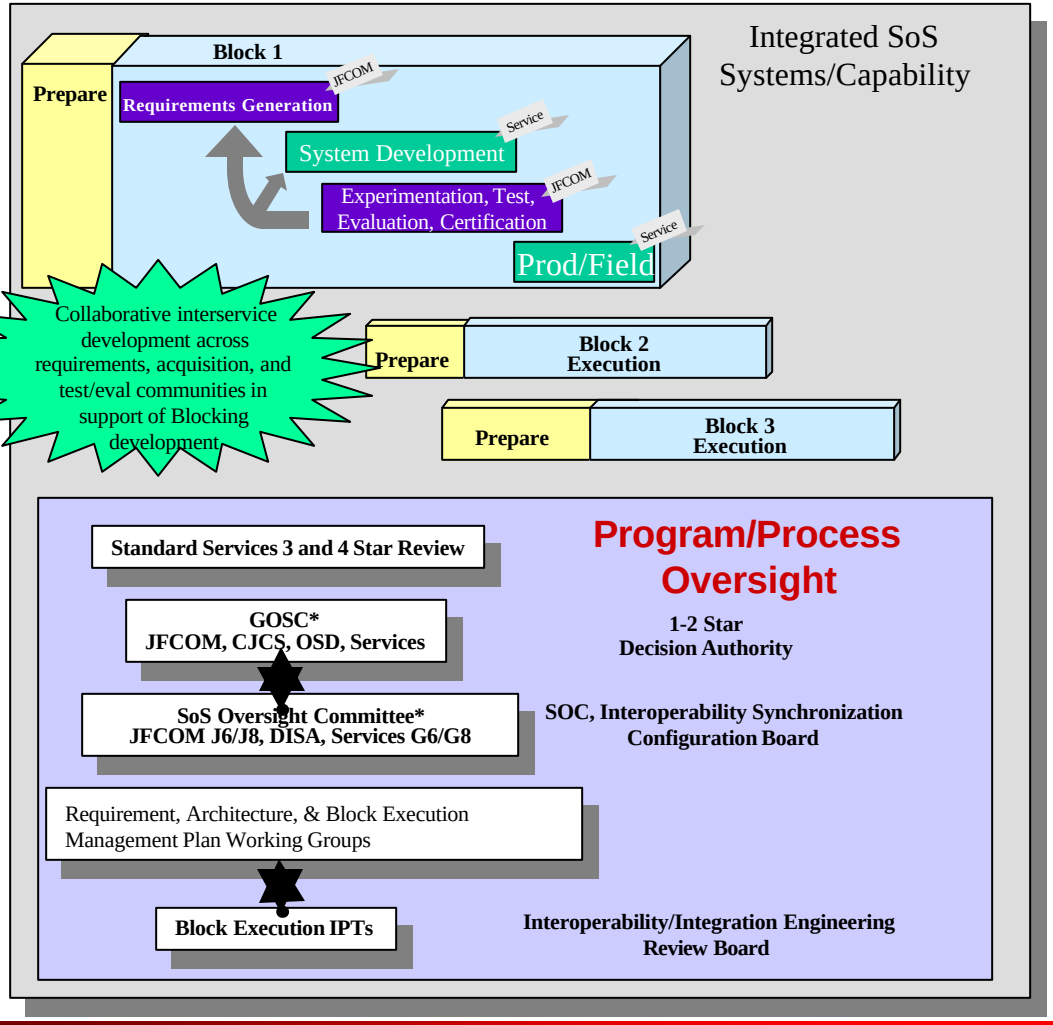
- **Policy coordinated across HQDA, Materiel Developer, requirement, and test communities (including OFTF) (54 Army GOs/SESs)**
- **Policy Approved by VCSA and AAE 18 September 2001 for immediate implementation**

- **SWB/integration and interoperability addressed as priority in POM 04-09**
- **SWB integrated into the Army Enterprise Architecture**
- **Resolved 167 potential interoperability problems resulting from system interface disagreements (out of 276 core interfaces)**

Capabilities Based Interoperability Process Enhancement

A Transforming Process

Objective: Ensure resourced capability across systems is integrated and interoperable in support of fielding



- **Joint control of requirements**
- **Joint test, evaluation, certification**
- **Joint control of CM**
- **Incorporates Joint Experimentation**
- **Service funds and develops**
- **Collaborative development of metrics, architectures, and standards**

Definition & Scope

This is the coordinated process of harmonizing the **requirements**, **development**, **fielding**, and **support** of SW intensive systems in order to ensure that they operate synergistically from an **integrated operational perspective** in support of the Warfighter.

Systems that have to fight together are certified and operationally evaluated together.

Across Service Boundaries, focused on the Joint Fight.